REMARKS/ARGUMENTS

Claims 1-4 have been amended to make them more definite and certain and to better distinguish the present invention over the prior art. Claim 6 has been amended to correct an inadvertent typographic error.

Claims 1-6

Claims 1-6 were rejected under 35 U.S.C. §102(e) as being anticipated by both Guettler et al (US Patent No. 6732721) and Guettler et al (US Patent No. 6616066). Guetler et al 6732721 is a division of Guettler 6616066. Both patents are directed to a particular device and its use for heating fuel, specifically a combination filter element/heating element/temperature sensor internally incorporated in a fuel injector. The invention is used to heat fuel ". . . as a result of which, in particular, pollutant emission during a cold-starting phase is permanently improved." (6732721 column 3, lines 1-3; 6616066 column 2, lines 65-67) Both patents make reference to "penetration distance." However, it is difficult to understand what is meant by their use of that phrase in the context of the described invention. Guettler et al's intent appears to be with controlling combustion properties, e.g., promoting instant atomization and compensating for different fuel compositions (for example see 6732721 column 3, lines 23-28 and 6616066 column 3, lines 20-34). What is certain however, is that neither reference addresses the problem of fuel impingement on combustion chamber surfaces.

The present invention is not directed to an apparatus for heating fuel, per se. It addresses the specific problem of preventing, or at least minimizing, fuel impingement on cylinder walls, particularly in engines that operate in more than one combustion mode. This problem is discussed at length throughout the specification and in particular on pages 10 and 11. For example, when operating in a homogeneous charge compression ignition (HCCI) combustion

mode, fuel is injected early on the combustion cycle so that fuel-air mixing takes place prior to combustion. The increased time period between the start of injection and the start of combustion occurs during a period of reduced pressure and temperature within the combustion chamber, a condition during which liquid fuel injected into the chamber can be readily, although undesirably, deposited on interior surfaces of the combustion chamber. In accordance with the present invention, and as illustrated in Figs. 1 and 2 of the subject application, increased fuel temperature is used to compensate for lower combustion chamber pressure and temperature during fuel injection and thereby prevent or minimize liquid fuel impingement during HCCI operation. This important discovery is not described, taught, or otherwise disclosed by either of the cited references.

It is respectfully submitted that the present invention, as set forth in Claims 1-6 as originally submitted, are not anticipated by either of the Guetller et al references. For example, neither Guetller et al reference addresses controlling liquid penetration length in response to a sensed engine operating parameter, nor do they teach determining a desired physical fuel penetration distance based on a sensed engine operating parameter.

Notwithstanding the above comment, by this amendment independent Claims 1 and 3 have been amended to make the distinction over both Guetller et al references even more evident. As now amended, Claims 1 and 3 additionally include determining a desired combustion mode based on one or more contemporary engine operating conditions. Moreover, the primary function of the present invention, i.e., minimizing fuel impingement on combustion chamber surfaces, is now set forth in the present invention as defined by Claims 1 and 3.

It is also respectfully submitted that the present invention, as now defined by amended Claims 1 and 3, would not be obvious to one of ordinary skill in the art in view of any of the

cited references. None of the references teach, suggest, provide any inducement or incentive, or other positive offer for consideration, the heating of fuel prior to injection to prevent, or at least minimize, liquid fuel impingement on combustion chamber interior surfaces.

Claims 2 and 4 have been amended to delete "combustion mode" as a listed engine operating parameter since it is now incorporated in the claims from which they respectively depend. "Engine speed" and "engine load" have been added to the listed engine operating parameters. Antecedent for the inclusion of these terms in the listed operating parameters is found on Page 14, line 15 of the Specification.

Claim 6 has been amended to correct an inadvertently placed space between the word "apparatus" and the comma that follows it.

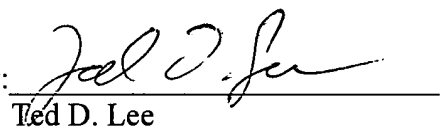
The other prior art of record has been reviewed but is believed to be of lesser relevance to the present invention than the two references specifically cited by the Examiner and discussed above.

No new matter has been added by this amendment.

It is respectfully submitted that in view of the above amendments, comments and the evidences presented herein, the claims of the above-identified application are in condition for allowance. An early Notice of Allowance is earnestly solicited. Should the Examiner feel that the prosecution of the application may be materially advanced by a telephone call, the Examiner is hereby requested to call the undersigned.

Respectfully submitted,

GUNN & LEE, P.C.
700 North St. Mary's Street, Suite 1500
San Antonio, TX 78205-3596
(210) 886-9500
(210) 886-9883 (Fax)

By: 
Ted D. Lee
Regis. No. 25,819

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited on the date shown below with the United States Postal Service in an envelope addressed to the "Mail Stop Responses/No Fee, COMMISSIONER FOR PATENTS, P.O. Box 1450, Alexandria, VA 22313-1450," as follows:

37 CFR 1.8(a)	37 CFR 1.10
[ ] With sufficient postage as First Class Mail. Date: _____, 2005	[X] As "Express Mail Post Office to Addressee," Mailing Label No. EV 678936056 US. Date: November 21, 2005

Amy Doyle

Amy Doyle

G:\TDL\SWRI\P-17.151\Response to OA.doc